Space Weather Forecast

Issued on Sunday, 23 April 2023 at 01:14 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Strong geomagnetic storm likely early Day 2 (Monday 24 April). Slight chance of R1/R2 radio blackouts throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low over the past 24 hours, with only minor Common-class flares observed. There are currently six numbered sunspot regions on the visible disc. The largest and most magnetically complex located in the northwest quadrant, although appears to be stable. A modestly large sunspot continues to rotate onto the southeast quadrant, although shows very little change or activity at present. All remaining sunspots remain small and stable, including the two new and currently unnumbered sunspot regions on the visible disc. A large full-halo Coronal Mass Ejection (CME) from the 21/1812 UTC Moderate-class flare and associated filament eruption (arc of plasma lifting off the Sun's surface) from near centre-disc is due to arrive at Earth either late on day 1 (23 Apr) or early hours of day 2 (24 Apr). No further Earth-directed CMEs have been observed in the last 24 hours.

Solar Wind / Geomagnetic Activity: The solar wind has ranged between slow and slightly elevated levels throughout. The associated magnetic field was stable and at weak levels. The all-important north-south component of the field was also at weak levels. The net effect of the above solar wind measures was for Quiet (Kp1-2) geomagnetic activity throughout.

Energetic Particles / Solar Radiation: No solar radiation storms were observed through the period, although an increase was noted after midnight UTC, with levels remaining below minor storm (S1).

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is most likely to continue at Low levels of activity with a slight chance of Moderate activity, mainly due to the largest sunspot group but perhaps also from the new region rotating onto the southeast.

Solar Wind / Geomagnetic Activity: The large full-halo CME from the 21/1812 UTC Moderate class flare and filament eruption is due to arrive at Earth either late on Day 1 (23 Apr) or early hours of Day 2 (24 Apr). The onset of a Strong Geomagnetic Storm is considered Likely early on Day 2 (Monday 24 April) from the 21/1812 UTC flare and filament eruption. Minor to Moderate geomagnetic storm is Expected. Activity then waning into Day 3 (25 April).

Energetic Particles / Solar Radiation: No solar radiation storms have been observed so far however some increase in activity is noted following the Moderate class flare on 21 April and there is a slight chance of a minor storm (S1). This is however more likely to be due to the largest sunspot region.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	30	80	30	10
Strong	G3	No	20	50	10	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	30	30	30	30
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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